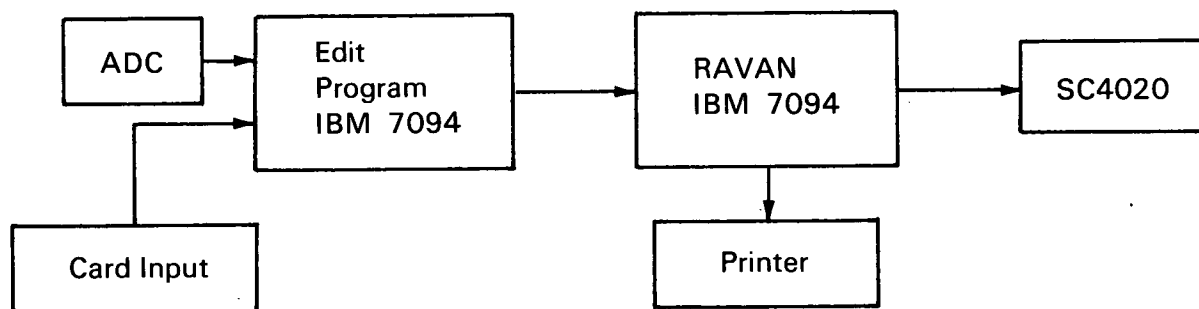


NASA TECH BRIEF



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Computer Program Performs Statistical Analysis for Random Processes



The problem:

To devise a computer program that will perform a variety of statistical analyses on data derived from random processes.

The solution:

Random Vibration Analysis Program (RAVAN), a computer program developed at Marshall Space Flight Center. This program was developed to perform statistical analysis on a number of phenomena associated with flight and captive tests (vibration, boundary layer, acoustics, etc.) but can also be used in analyzing data from many other random processes. Input to the program can come from either punched cards or an analog-to-digital converter, and output can be obtained in either printed or plotted form.

How it's done:

The Random Vibration Analysis Program is written in SHARE Compiler-Assembler-Translator (SCAT) and is designed to operate on the IBM 7094 computer with an IBM 1401 off-line printer and a

Stromberg-Carlson 4020 plotter as outputs. If a plotter is not available, the program contains a print-plot option.

RAVAN has many options for various statistical analyses. In addition to basic statistical analysis, the program can calculate the probability density and distribution functions; the Gaussian and Rayleigh functions; the functions of autocorrelation and cross-correlation; the power spectral, cospectral, quadratic spectral, and hanned, or smoothed, cross-power spectral density functions; and the transfer and coherence functions. Tests for stationarity and peak analysis also are available.

Raw data are generally stored on analog tape and digitized by an analog-to-digital converter (ADC), but options are available for punched card input. The output from the ADC is processed by the edit program, which monitors the data for errors and places the converted data into the RAVAN input format. It is mandatory that the input tape to the

(continued overleaf)

RAVAN be edited and converted to the engineering units of interest. This approach lends itself to installations or organizations that use various ADC output tape formats.

All input and control parameters are initiated by Massey's Automatic Variable Read into Kore subroutine (MAVRIK). This subroutine is a Symbolic Data Loading system for the Supervisory Program Over Other Kinds (SPOOK) system.

Notes:

1. This program is presently being used by several industrial organizations in a variety of applications.

2. A report, entitled "Random Vibration Analysis Program (RAVAN)," NASA TM X-53359, is available and contains a brief description of the mathematical techniques employed and detailed descriptions and flowcharts of the computer program and subroutines.
3. Inquiries concerning this program may be directed to:

Technology Utilization Officer
Marshall Space Flight Center
Huntsville, Alabama 35812
Reference: B66-10525

Patent status:

No patent action is contemplated by NASA.

Source: Murl H. Newberry
Marshall Space Flight Center
(M-FS-723)